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POLICY FOR SCIENCE AND TECHNOLOGY FOR DEVELOPING TRADITIONAL INDUSTRIES IN BACKWARD AREAS : PROBLEMS AND PROSPECTS

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> "A critical history of technology show how little any of the inventions of the 18th century are the work of a single individual. Hitherto there is no such book. Darwin has interested us in the history of nature's technology, i.e. in the formation of the organs of plants and animals, which organs serve as instruments of production for sustaining life. Does not the history of the productive organs of man, of organs that are the material basis of all social organisation, deserve equal attention? And would not such a history be easier to compile, since, as Vico says, human history differs from natural history in this, that we have made the former, but not the latter? Technology discloses man's mode of dealing with nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations, and of the metal conceptions that flow from them". Marx, Capital, Vol.I (1965), p.372.

The history of mankind is a record of how science as a means of acquiring knowledge about Nature, and technology as a method of utilising it for the benefit of man have constantly evolved and progressed and how scientific and technological progress has been the dynamic force of social evolution and development. If we look at the history of social evolution and development, we note two things which underline the dynamic role played by scientific and technological progress in it. Firstly, material production is the foundation of all social existence; and secondly, the social reproduction of the productive forces is the basis of development for all societies - whether they are primitive or modern, contemporary or of the past.[1]

"The social reproduction of the productive forces involves not merely the static recreation of the initial conditions of production but also the dynamic expansion of the productive apparatus".[2] In other words, the social reproduction of the productive forces/or apparatus is the recreation of the techno-organisational conditions of production in which natural objects are transformed into material conditions or objects to satisfy human needs. The recreation of given techno-organisational conditions of production in a society is the result of a given state of science and technology prevailing therein from the past. This shows how in a given period of time science, technology and society are historically integrated; and how the historical process of such integration embedded in the social reproduction of the productive forces discloses the techno-organisational conditions of production and so consequently, the corresponding mode of production.

The form of integration between science and technology into society, thus, depends on the level of development of the productive forces, i.e. the state of progress of science and technology itself which varies from one society to another. Broadly speaking, two forms of integration may be historically discerned : natural (or traditional) and modern. The natural form of integration refers to that phase of historical development in which science and technology exist in the form of knowledge and skills acquired by the man through the natural process of the expansion of the division of labour. In this form, he is the producer as well as the owner of the means of production. The acquisition of knowledge, skills and the use of techniques are under the domain

of some specific social groups wherein they are producers as well as owners of the means of production. Hence science and technology are operative as an integral part of the traditional system of production but not as a specialised part of the system of education and research interlinked with production processes as we find today. However, the social character of this form of integration varies from one society to another, depending on the existence of its mode of production.

The modern form of integration between science and technology and society refers to that phase of development in which science and technology have emerged as a separate stream of intellectual production (of scientific knowledge and technological innovation) in the form of a reproducible commodity which can be bought and sold. In this phase, the producer is not necessarily also the owner of the means of production but the two are generally separated. Again, the social character of this form of integration depends on the mode of production which exists in society. It should also be borne in mind that the modern form of integration between science and technology into society is also historically determined by an ideology behind which fundamental sciences dealing with Nature are studied and used for innovating technologies, and corresponding technical knowledge is utilised in the process of production. Hence the form of integration between science and technology into society, depending upon the modes of production, will be historically different from one society to another.

II. Characteristics of Integration in Indian Society

The natural form of integration is the characteristic of traditional societies; whereas the modern form is the basic feature of developed societies. Developing societies are characterised by the existence of dualistic form of integration between science and technology; i.e. a combination of both, natural and modern forms of integration. Such dualistic combination is found in developing societies like India because of traditional knowledge, practices and techniques in the so-called, informal sector and the application of modern science and technology in the organised, formal sector. The application of traditional practices and techniques in the informal/unorganised sector, which is large in size, implies the existence of such a techno-organisational condition of production wherein household is the unit of production, the producers and the owners of means of production are identical; and the age-old acquired knowledge, practices and techniques are transmitted from one generation to another.

As mentioned above, the natural form of integration between science and technology into society came into existence as a product of the natural division of labour. Thus level or state of scientific and technological knowledge reproduced a given level of development of the productive forces and correspondingly, a set of production relations. The social reproduction of such productive forces and the recreation of corresponding production relations characterise the existence of earlier modes of production (called, precapitalist) in the informal sector. Thus the informal sector represents precapitalist mode of production wherein the techno-organisational conditions of production are traditional

and correspondingly, there exists a socio-economic structure of production consisting of peasants, artisans and other petty producers who mostly produce at the household level.[3]

The characteristic features of the formal sector lie in the application of modern scientific knowledge and technology in the process of production wherein the producers and the owners of the means of production are not the same, the unit of production is not the household but based on a rationalised and specialised system of management and organisation, and capital and labour are completely differentiated. This sector reproduces investible surplus and the process of social reproduction involves the dynamic expansion of the productive apparatus. The existence of this sector represents the case of the capitalist mode of production wherein the techno-organisational structure of production is modern science-technology-based and there exists a socio-economic structure of production comprising capitalists (or owners of the means of production) and workers.[4]

The co-existence of informal and formal sectors in developing societies is, thus, nothing but the historical coincidence of the precapitalist and capitalist modes of production, or for that matter, a combination of the natural and modern forms of integration between science and technology into them. Alternatively, such co-existence may be attributed to the phenomenon of technological dualism. The phenomenon of technological dualism not only persists but also grows because the formal sector experiences an intensive application of modern scientific knowledge and technology in the process of production. Because of the predominance of the informal sector; the modern formal sector becomes an enclaved system

restricted to specific industrial activities at certain localised urban centres. The characteristics of enclaved formal sector expansion generate a pattern of market-cum-technological relations whereby the informal/unorganised sector remains subordinate to the formal sector in terms of serving the vested 'interests' of the latter. As a result, the technological gap between the formal and informal sectors increases (and also widens) in a developing society and the dependency of the informal sector on the formal sector is reproduced in different forms and orders.

The preponderance of traditional values and beliefs in the informal sector is said to be a drag on the rational adaptation of modern science and technology to the process of production in the informal sector of the developing society. Hence the need for building a scientific temper is stressed. It is not clear how such a temper can be built in this sector when the system of formal education is traditional and the system of technical education, training and fundamental research is restrictive due to unequal accessibility.

Moreover, the transfer of scientific knowledge and technology from developed to developing societies reproduces foreign skills but does not produce innovating skills and activities among the local producers in the informal sector. The system of adult education based on T.V. or extension services and demonstration or mass literacy programmes are the media through which people get more education about the prevailing culture, traditions, religion and language. How can we build a scientific temper without basic schooling in science and technology in the rural areas of the

developing societies? How can we build a scientific temper by alienating peasants, artisans and other petty producers and without extending the division of labour within occupations? The natural form of integration between science and technology may continue to exist with further distortions and destruction of local skills and techniques along with the expansion of the formal sector on the basis of technical knowledge and techniques imported from the advanced capitalist countries; the importation of which generally brings about foreign skills, organisations and methods of operation without creating own capacity to innovate in the informal sector. These are some questions which policy-makers have to answer while formulating a policy for science and technology for development.

III. Scientific Order and Policy for Science and Technology

The dualistic form of integration between science and technology into a developing society like India also characterises the co-existence of two types of scientific orders-traditional and modern.[5] Traditional scientific order signifies a kind of scientific temper called traditional, which is historically built among local people on the basis of beliefs, customs, rituals, and traditional norms and practices. Such an order or temper is sustained because of the reproduction of the given productive forces and their corresponding production relations. That is why the informal sector of production (i.e. the sector producing commodities by self-employed peasants, artisans or handicraft workers generally called petty producers) is reproduced in this society. The prevalence of traditional order is taken to be a resisting force to building a scientific temper in the modern sense of the term.

The concept of modern scientific order, which is the basis of modern-formal-industrial sector, is a rational outlook for using modern scientific knowledge and technological innovations in the process of production. The realisation of this order in actual life requires the dynamic expansion of the productive apparatus and correspondingly, technical dynamism and entrepreneurship.

The concept of modern scientific order in India historically dates from British rule in the country. The characteristic pattern of trade relations between 'Overseas' and 'Periphery' created an urge among the ruling class for 'technology transfer' in some specific areas of industrial production such as cotton textile, sugar and plantation in the colony which simultaneously also led to technology transfer in the field of transport and communication. These cases of trade needs-based technology transfer also evolved a similar pattern of trade relations between the centre (metropolis) and periphery at home within the colony. As a result, two things happened in British India[6]: (a) destruction of local manufacturing industry, and (b) emergence of a new sector, called formal-with new productive apparatus and production relations at the metropolitan centres of the colony.

The characteristic pattern of trade relations between centre and periphery and the emerging techno-economic structure of production in the formal sector also led to the creation of a new scientific order, being quite alien to the prevailing scientific order in the Indian society.

Colonial rule was never interested in realising the concept of modern scientific order as a universal phenomenon in Indian

society. As is obvious, this order came into existence in response to the trade needs-based technological use and so remained confined to certain areas of production belonging to the native metropolitan centres. In this way, enclaved growth centres emerged which were completely external to the periphery. The British system of formal and technical education which came into being during the 19th century was meant for creating centres of foreign education, training and skills in order to supply educated and skilled manpower for the colonial administration and for expanding trade-based colonial process of industrialisation; but not for creating technical knowledge and skills among the local people in order to technologically transform the traditional societies at the periphery.

Thus the colonial process of expansion led to the creation of two extremes - 'enclaved growth centres' and underdevelopment at the periphery. The modern scientific order, enclosed as it was within the formal sector, could not build a scientific temper in the Indian economy under British rule.

When India became free from the clutches of British rule, what she got was 'enclaved growth centres' with stagnant and sterilised rural societies. The Nation owes a lot to the late Pt. Nehru for visualising and concretising the role of modern science and technology in the creation of a modern economy and society in the country. The Industrial Resolution Policy of 1956 and the Scientific Policy Resolution of 1958 gave shape to his vision in this regard. In this way, the country formulated a policy model for science and technology as an integral part of national development and industrialisation which is summed up in Table 1.

Table 1 : Policy Goal and Sectoral Characteristics of Policy Choice for Technology

Sector	Policy Goal	Policy Choice for Technology
Leading	Capital formation through internal and external markets and import substitution. Linkage with economy to increase productive capacity in capital goods and or provide a 'growth pole' for surrounding activity.	1. Achievement of world technology frontier which implies the importation of foreign technical know-how, knowledge and technology 2. Efforts to assimilate the technology in a 'learning by doing' exercise and perhaps eventually replicate the technical know-how and technology. Capital intensity may be a necessary consequence of imported technologies.
Secondary	To serve the leading sectors' needs as well as miscellaneous domestic demands	Reliance on foreign technology depending on foreign exchange saving and/or earning capacity. To an extent this sector makes but use of second hand technologies, whether domestic or foreign. Here it would not at all be clear whether there is an objective constraint on capital intensity.
Traditional	To provide basic needs which are not usually met by the former sectors. The sector is by definition the one through which historically prevalent demands for non-agricultural output are met, it may be used to provide non-urban unemployment especially since there will be a tendancy towards labour intensive industries.	To adopt a non-discriminatory attitude towards deepening of technological capacity (e.g. introducing new sources of power to traditional technologies) as well as widening the use of existing techniques in order to achieve a short-term solution to the basic needs problem. With an active policy meeting these criteria, this sector may offer the greatest grounds for employment stabilisation.

Source : See Notes and References (7).

What does the above model of policy for science and technology-based industrial development mean? (a) Technology transfer including technical know-how for the expansion of import-substituting industries and the use of second hand knowledge and technology for the expansion of 'Secondary Sector', and (b) development of handicrafts and cottage/village industries based on local skills and traditional technology for satisfying the non-agricultural needs of the local population in rural areas. The first implies the creation of a sector based on modern science and technology and the second aims at the reconstruction of the traditional sector of the economy on which a large chunk of rural population depends. In other words, the application of modern science and technology is needed for the development of new productive forces through the expansion of leading and secondary sectors (i.e. modern formal sector) and the revival and development of handicrafts and cottage industries is stressed for the growth of petty producers. The purpose of the latter is to create opportunities for self-employment in the rural areas so that the pressure of rural population on agriculture could be eased. The idea behind the expansion of leading and secondary sectors is to expand commodity production for creating surplus, capital accumulation and technical dynamism for promoting entrepreneurship. As a result, the Indian economy has experienced the process of technological transformation but predominantly in the formal sector. The spatial coverage of growth centres relatively increased but remained enclaved in certain parts of the economy.

The expansion of technical education, training and scientific research generated technical and scientific man-power in the economy but could not generate technical knowledge, skills and innovating

activities among the local people in the informal sector or rural areas. As a consequence, the formal and informal sectors technologically remained two separate parts of the society. The only links between them are the marketing-trade links. The characteristic pattern of trade relations between these two sectors, more or less, remained the same as it was during the colonial rule. Moreover, the pattern of such relations reproduced conditions of pauperisation among petty producers in the informal sector. Modern science-technology-based industrialisation widened the technological dualism between the formal and informal sectors of production in the economy because the adoption of new scientific knowledge and technology could not generate technical relations between them. On the contrary, it provided only trade-cum-marketing links between them. Whenever and wherever new scientific knowledge and technology came into operation in the informal sector, it has been through the flow of trade-commerce-based needs, but not through the release of technological complementarities from the formal sector. Hence the modern scientific order existing in the formal sector could not change the traditional order of the rural societies and informal sector and as a result, their contradictory relations reproduced retarding effects on the development of a scientific temper in a large part of the economy.

IV. Traditional Industries : Place, Role and Conditions in Development Process

The existence of handicrafts and cottage industries characterises a historical continuity of the earlier mode of production in rural India wherein household is a unit of production, the producer is also the owner of the means of production, agriculture and manufacture are institutionally and technologically interlinked and

interdependent, there is no division of labour within occupations and traditional skills, knowledge and technology are continuously reproducing static conditions of production. The colonial mode of production as super-imposed by England during the British rule in India, destroyed "its inner and spontaneously grown and operating ties between agriculture and industry having based on the internal structure of social relations and indigenous traditional technology" and so handicrafts and cottage industries as an earlier mode of production were technologically and institutionally placed as a 'delinked' segment of production in the Indian Society.[8] The process of segmentation of handicrafts and cottage industries also continues to operate in post-Independent India, despite some efforts made to develop these activities as outlined in the Industrial Policy of 1956 and 1978 and in the Plan documents. An obvious reason for their segmentation has been the concentration of benefits from the application of modern science and technology in the organised formal sector of production, as the process of industrialisation in modern India indicates. The process of industrialisation (or for that matter, modernisation) promoted primarily through technology transfer (including technical know-how and scientific research and development) could not create technological complementarities for the development of handicrafts and cottage industries nor any appropriate techno-organisational linkages to establish some sort of functional rapport with these industries. Modern science-technology-based process of industrialisation in the formal sector along with fiscal and monetary measures have created a pattern of income distribution relations (and correspondingly a pattern of consumption) since the colonial days which has disfavoured the development of handicrafts and cottage industries. As a result, these industries have remained

unorganised suffering from technological stagnation and sterility, despite their significance in the Indian economy and the importance attached to them by the Industrial Policy of 1956 and 1978 and in different Plan documents. Thus handicrafts and cottage/village industries, as they stand and exist today, may be technologically and organisationally represented as a segmented part of production in the Indian economy. The Sixth Five Year Plan document affirms it in the following manner :

> "While the traditional industries are generally artisan-based, located mostly in rural and semi-urban areas involve lower levels of investment in machinery and provide largely part-time employment : modern small scale industries and powerlooms use mostly power-operated appliances and machinery have some technological sophistication and are generally located close to or in the urban areas including the large industrial centres". 9/

The spatio-segmentary characteristics of handicrafts and cottage industries show that they are primarily localised in rural areas. The 1971 Census indicates that a little more then 37 per cent of the total industrial workers are household industry workers and the rest are non-household industry workers. But three-fifths of the total industrial workers of rural India are household industry workers and the rest of them are non-household industry workers; and more than 82 per cent of the total industrial workers of urban India are non-household industry workers, while only about 18 per cent of them are household industry workers. As far as U.P. is concerned, half of the industrial workers of the State are still household industry workers and about 68 per cent of the total industrial workers belonging to the rural areas are household industry workers. Thus the distribution of industrial workers between household and non-household categories shows that household industry, comprising of handicrafts, cottage and village industries,

etc. is predominant in rural (and also in semi-urban) areas but non-household industry in urban areas.

Table 2 : Distribution of Industrial Workers Between Household and Non-household Industries in India and Uttar Pradesh

(in per cent)

Industrial Groups	Uttar Pradesh			India		
	Total	Rural	Urban	Total	Rural	Urban
Household Industry	50.29	67.60	29.11	37.14	58.33	17.84
Non-household Industry	49.71	32.40	70.89	62.86	41.67	82.16
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source : Economic Characteristics of Population, Paper 3, 1971 Census

The segmentary characteristics of the traditional industries are not only spatial but also techno-organisational. Table 3 highlights some of the techno-organisational characteristics of these industries. The traditional industries bear a major part of labour absorption (as they engage more than 58 per cent of total employed persons); but they produce 13 to 16 per cent of total output which is quite low compared to the proportion of output produced by the modern small scale industries. This is also true in respect of U.P., if we look at Table 4. If the level of labour productivity is taken as a proxy to reflect the level/or state of technology used in the production process of the traditional and modern industries, then the same table shows that these industries are not technologically comparable. The fact is that the value of output per employed person varies from Rs.2140 in 1973-74 to Rs.3323 in 1979-80 in the traditional industries; while in the modern small scale industries it varies from Rs.183600 in 1973-74 to Rs.297467 in 1979-80. A wide range of differences in the level of productivity also exists between the organised and unorganised sectors in Uttar

Table 3 : Relative Proportion of Output and Employment in Traditional and Modern Industries (All India)

	1973-74	1979-80
1. Distribution of Value of Output (in per cent)		
a. Traditional Sector	16.05	12.26
b. Modern Small Sector	67.50	74.20
c. Others	16.45	12.54
d. Total	100.00	100.00
2. Distribution of Employment (in per cent)		
a. Traditional Sector	57.96	59.82
b. Modern Small Sector	28.15	31.59
c. Others	13.89	8.59
d. Total	100.00	100.00
3. Value of Output Per Employed Person (in Rs.)		
a. Traditional Sector	2140	3323
b. Modern Small Sector	183600	297467
c. Others	89480	168240

Source : Sixth Five Year Plan, 1980-85 (Part II), Planning Commission, Government of India.

Note : a. Includes Khadi, Village Industries, Sericulture, Handlooms, Handicrafts, and Coir

b. Includes Small Scale Industries and Poerlooms. They have investment in plant and machinery upto Rs.20 lakhs (and in the case of ancilliary units upto Rs.25 lakhs).

c. Includes units not covered under the specified industry groups.

Table 4 : Relative Portion Output and Employment in Organised and Unorganised Sectors in U.P.

	1974-75	1979-80
Distribution of Output (per cent)		
Unorganised Sector	32.00	31.00
Organised Sector	68.00	69.00
Total	100.00	100.00
Distribution of Employed Persons (per cent)		
Unorganised Sector	59.00	66.00
Organised Sector	41.00	34.00
Total	100.00	100.00
Value of Output Per Employed Person (in Rs.)		
Unorganised Sector	8994	8483
Organised Sector	27293	37418
Total	16553	18271

Source : Draft Sixth Five Year Plan, 1980-85,(Vol.I), Government of U.P.

Pradesh; as Table 4 indicates. A primary data-based study done in the context of U.P.'s rural industries by T.S. Papola[10] has observed that the rural industrial sector (traditional industries in particular) practically absorbs all the labour available with households but at quite low level of productivity and income. The existence of greater employment load and low productivity in the traditional industries, in fact, characterises two things : firstly, the predominance of household-based form or organisation of production wherein mostly family labour force is employed; and secondly, the use of traditional technology due to which the productivity capacity of labour in these industries is quite low.

Given the use of traditional technology and the household form of production, Table 5 shows that the traditional industries are not only low productivity-generating activities but also have low output elasticity of employment. With respect to U.P., the comparative picture of employment and productivity relating to the organised and unorganised sectors actually presents a more frustrating scene. The existence of low productivity with a declining trend from Rs.8994 in 1974-75 to Rs.8483 in 1979-80 and higher output elasticity of employment (i.e. 1.14) implies that the existing techno-organisational form of production simply creates a large pool of unproductive employment. All these characteristics alternatively reflect the nature of segmentation that exists between the traditional and formal sectors at the techno-organisational level of production.

Table 5 : Output Elasticity of Employment in India Between 1973-74 to 1979-80

	Elasticity
1. Traditional Sector	0.2926
2. Modern Small Sector	0.3654
3. Others	0.0231
4. All	0.2539
Output Elasticity of Employment in U.P. (1974-75 to 1979-80)	
1. Unorganised Sector	1.1423
2. Organised Sector	0.5034
3. Total	0.8001

If the series of Census data concerning distribution of industrial workers between household and non-household categories since 1901 are computed and compared, one may mark successive declines in household industry workers in India. The successive declines, in fact, show two historical phases-colonial phase wherein the superimposed colonial mode of production destroyed indigeneous industries, skills and technologies; and secondly, the phase of post-independent India wherein the modern science-technology-based expansion of the formal sector at the colonial base led to the capitalist mode of production which created conditions leading to the pauperisation of petty producers of the traditional sector. The process of pauperisation also converted many of them into the class of agricultural labour. The increasing proportion of agricultural labourers to total work-force bears a witness to this fact.[11]

All the above characteristics indicate that the traditional sector of petty producers remains segregated from the modern sector not only spatially but also technologically and organisationally, as the historical process of change and development indicates in developing India. The segmentary characteristics of the traditional sector also seem to be retained by household-based approach to rural development, which in modern jargon is referred to as the 'minimum needs-based strategy' of development. Emphasis is laid on the development of the traditional sector by improving its technology for meeting historically prevalent demand for non-agricultural output. In this context, the concept of 'appropriate' technology is also very much talked about. The idea behind this approach is to generate self-employment and self-income. By

implication, this amounts to maintaining the elements of caste-activity association and occupational immobility in the traditional sector.

But the irony of the fact is that the economies of household production do not favour the application of improved technologies, even though available skills are capable of operating them. Hence the age-old traditional technologies continue to operate in the traditional sector of production and the long continuing traditional mode of production technologies has been subject to deprivation of the beneficts from modern science and technology.[12] This has lead to form an impression among policy-makers, scientists and social scientists that traditional pursuits and the rigidity of caste-activity association hinder the building of a scientific temper among local people and the application of modern scientific knowledge and technology in the process of production.

The role of handicrafts and cottage industries in the development of rural India is very much lauded in common parlance, Plan and policy documents because of the following : firstly, the development of these activities can diversify the economic structure of the rural economy. Secondly, they are least capital-involving and most labour-oriented. Thirdly, they are the sources of self-employment and self-income creation. Fourthly, they only use local resources and skills having no risk of dependency. Fifthly, they are the preserver of traditions, values and culture and so the development of these activities is taken as a matter of national pride and glory.

The above causal explanations are more 'populistic' than realistic. The historical realities of development as a process bear out the following cases, despite the efforts made by the Khadi Gramodyog and Village Industries Commission to develop handicrafts and cottage industries and by the policy measures and programmes of the Government to develop them through cooperatives of various types : (a) conversion of village artisans as agricultural and non-agricultural workers leading to decline in handicrafts and village industries;[13] and (b) growth of urban informal sector as a product of the capitalist process of development which makes it subjugated to the formal sector.[14] The first is caused by the transfer of agricultural technology in particular and emerging new agrarian production relations and corresponding distribution relations which have adversely affected the pattern of demand for traditional non-agricultural output and services. The second is caused by the migration of rural labour force, which is itself a product of 'artificial' poverty creation in rural areas, and by the forces of capitalist development to enforce the modes of sub-contracting labour to maintain wages at low level, and mercantile the products including services to supply them for earning profits in the urban informal sector. As a result, the activities like handicrafts and village industries do not experience the process of technological transformation as required for development. Credit and subsidies flow, but they help more in creating intermediaries in different forms and orders to exploit than in developing these activities. Intermediaries use money lending as a weapon to buy goods and services of the traditional sector at cheaper prices and so these activities yield low income for subsistence. Hence the technical conditions of production do not change but remain to be static.

The oligopolistic control of trade over the supply of raw materials like oilseeds, cotton, forest-based products, animal husbandry-based products etc. is another factor which adversely affects the operation of production in the traditional sector. The distribution pattern of raw materials belonging to the public sector is also unfavourable to these activities.

What does the above indicate? Handicrafts and Cottage industries are techno-organisationally a segmented part of production which continues to exist, in some or other, with the expansion of modern sector based on modern scientific knowledge and technology. Thus the co-existence of these two sectors presents a case of historical continuity of the precapitalist and capitalist modes of production. The dominance of the latter creates a number of forces to exploit the traditional units of production in different forms and orders. As a result, the techno-organizational conditions of production do not change but continue to remain static and yield low incomes for subsistence.

V. How to Develop Traditional Sector?

Traditional sector does not lack 'appropriate' skills but is deprived of the benefits from the application of modern science and technology. There has been such deprivation because the prevailing techno-organisational conditions of its production are not suitable for the adoption of modern or improved technologies and practices which are available within the country in the name of 'relevant' rural technologies and inputs.

Most of the available modern technologies and production inputs relevant to rural areas for the development of traditional activities assume the existence of such a techno-organisational stru-

cture of production which functions on the principle of 'scale' but not on the household unit theory of production. Hence they can be comfortably adopted by 'small scale' production enterprises who own some capital and may take investment risks. Unfortunately, the units of small scale production do not increase and grow as expected, despite the availability of modern technologies and inputs and facilities for capital investment because the characteristics of the dual mode of production act against their expansion. The consequential impact of this action-in-process in both sectors-traditional as well as small scale production part of the formal sector - produces a chain of 'discontinuities' in the process of industrialisation and so the process of development becomes restrictive in operation.

The existing techno-organisational structure of production of handicrafts and cottage industries is itself hinderance to their development, the characteristics of the transitional process of capitalist development apart. The development of these activities lie in sincere efforts to technologically interlink them with the process of industrialisation and modernisation through the application of modern science and technology. The interlinking them technologically with the process of modern sector expansion will change their existing techno-organisational structure of production. The question is : how could this desired end be translated into actual?

In view of the above idea, the areas of handicrafts and cottage industries, the types of commodities produced and technical services rendered, and resource needs should be identified. It may not be difficult to identify them. Handicrafts and cottage industries generally produce two types of commodities-consumer's goods and

small capital goods such as agricultural implements, and implements for their consumer's goods production units. There are also service rendering units in this sector which are related to the repair of tools, implements and machinery which are used in agriculture, hand-looks, ghanies, etc. This means that they produce consumer's and capital goods, and also render technical services. By recognising these characteristics of commodity production, the R & D institutions should evolve improved technologies for the development of the consumer's and capital goods producing units of the traditional sector and also evolve appropriate tools and instruments for the units which render technical services. But this is not enough. They also require organisation and so the Government should play a leading role in providing proper organisations to these activities. On the basis of identified areas and resource needs, the Government should organise these activities on the basis of either cooperative ownership or public ownership. Hence individual units of production should be pooled together at different central places in rural (or semi-urban) areas. In this way, there will be a number of selected spatial centres of a dispersal character.[15] The use of improved technologies and the cooperative or public ownership organisation will transform the existing techno-organisational structure of production in the traditional sector and consequently, there will be both types of integration-horizontal as well as vertical - within and across the traditional sector's activities. In this way, the process of development in this sector will establish technical relations with the expansion of the formal sector in India.

If all this is not worked out and sincere efforts are not made for technologically transforming the traditional sector, it may slowly die out till the process of capitalist development envelops

it wholly. The household approach to developing handicrafts and cottage industries simply articulates the precapitalist mode with the capitalist mode of production which restricts not only the use of modern scientific knowledge and technology but also the process of modernisation and development in the Indian society.

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Notes and References

1. In the introduction to his Grundrisse, Marx has discussed how material production is the starting point for social existence and how the process of material reproduction has been the basis of development in all societies. Please also see Geoffray Key, Development and Underdevelopment : A Marxist Analysis, Macmillan, 1975.

2. Amin, Samir, Imperialism and Unequal Development (Essays), The Harvester Press (1977), Chapter 9, p.153.

3. The historical characteristics of the co-existence of informal and formal sectors in the process of development show two things : firstly, the dominance of the capitalist mode of production in the productive system of the economy; and secondly, retention of some of the basic elements of the earlier modes of production accompanied by the growth of unorganised small establishments and other petty commodity producers predominantly in urban India. Thus there exists informal sector in two forms (or in two historical orders) colonial and post-colonial. Both of them constitute a unit of historical continuity in the capitalist process of development operating over a long period of time in the country. The colonial form of the informal sector also implies the indigenous socio-economic structure of production which existed as a 'carry-over' from the past. Today, the artisan-based village/cottage industries manifest some of the characteristics of the indigenous precapitalist mode of production; while small establishments and other household units of petty commodity production characterise the existence of unorganised informal sector primarily in urban India. The sector comprising these industries also manifests a precapitalist mode of production which has come into existence in response to the needs for the expansion of the capitalist process of production in the formal sector of urban India. How and why the colonial form of the informal (or in other words, colonial form of precapitalist mode of production) sector is retained, Hamza Alvi says that "the elements of indigenous precapitalist modes are not dissolved by the development of colonial capitalism . . . colonial capital brings about instead a conservation and dissolution (both at once) of the precapitalist modes of production in colonial social formations : that it sub-ordinates them in order to subserve its own purposes," (Peripheral capitalism, State and Society, January-March 1981, pp.55-56). In his unpublished paper, 'The Petty Commodity Sector in Urban Ghana' in British Sociological Association, Development Group (1976), Bryant has shown how the given pre-existing economic structure, the system of petty and articulated commodity production was maintained by foreign entrepreneurs to extract 'surplus value by mediating between metropolitan producers and Ghanaian market' and allowed foreign capital to extract surplus value 'through the payment of low wages . . .' An empirical study by Papola on the characteristics of informal sector in the Ahmedabad city of Gujarat shows how the small establishments and other household units of petty commodity production are related to the formal sector and this aspect of his study in fact shows how and in which direction, the informal sector exists and operates in response to the needs for the formal sector of production. Please see his Urban Informal Sector in a Developing Economy, Vikas, 1981.

4. This also includes public sector/state-owned or sponsored enterprises. Why so, may be quoted the following to reply to it : "Capitalism itself is not transcended as long as the state guarantees the continuity of capitalist social relations of production and its class structure by virtue of capitalist property that separates the producer from the means of production by interposing between them an exploiting class. This applies to 'public sector' enterprises also, that operate within the framework of peripheral capitalism and are subject to its imperatives. State sponsored or state-owned enterprises in such cases are no more than 'bearers of capital', one more form of organisation of capital, which takes many forms by of individual or corporate ownership". Hamza Alavi, 'Peripheral Capitalism', State and Society, April - June, 1981, p.36.

5. The classification of traditional and modern scientific orders is not taútological but there are the derivatives corresponding to the natural and modern forms of integration between science and technology into society which exist today in developing India.

6. For details, please see Gadgil, D.R., The Industrial Evolution of India in Recent Times 1860-1939, Oxford University Press (1974).

7. 'Technology and Development : Problems and Responses' (Introduction), Development Research Digest, No.3, Spring 1980, p.6.

8. Mishra, G.P., 'Characteristic Features of Dominents Agrarian Relations and Class Basis of Rural Development in India', Working Paper No.34, Giri Institute of Development Studies, Lucknow.

9. Sixth Five Year Plan, 1980-85 (Draft), Planning Commission, Government of India, p.303.

10. Papola, T.S., 'Rural Industrialisation : Approaches and Potential', Mimeograph No.13, Giri Institute of Development Studies, Lucknow.

11. "With the decay of household and small scale rural industries, artisans may have no other alternative but to look for employment in agriculture. . . . cultivators and other workers have remained more or less constant. The entire increase of 28 million in the rural work-force has joined the class of agricultural labourers. Strictly speaking, it is not the proletarianisation of the peasant but their impoverishment in the context of a stagnant non-agricultural sector in the countryside which accounts for nearly 100 per cent increase of agricultural labourers". Sau, Ranjit, India's Economic Development : Aspect of Agrarians Relations, Orient Longman, 1981, pp.18-19.

12. Please see T.S. Papola's study, 'Production of Woolen Carpets in Kumaon and Garhwal' (Giri Institute of Development Studies, Lucknow, 1980) in which he shows how woolen carpet industry is experiencing stagnation and decline; and how technological innovations are needed for the expansion and development of this industry in hilly regions of U.P. Alternatively, his study also stresses the need for innovating research (in terms of consumer tastes and technical, chemical and design aspectsof its production) in order to overcome technological stagnation due to which highly skill-intensive industry being a preserve of the Bhutia tribe is suffering from decline in production.

13. Please see Singh, H.K. Manmohan, "Population Pressure and Labour Absorbility in Agriculture and Related Activities : Analysis and Suggestions Based on Field Studies Conducted in Punjab", Economic and Political Weekly, March 17, 1979; and Byers, T.J., 'The New Technology, Class Formation and Class Action in Indian Countryside', Journal of Peasant Studies, July, 1981.

14. Please see Breman, J.C., Informal Sector in Approach : Theory and Practice, Rottardam, 1980 and Papola T.S., Urban Informal Sector in a Developing Economy, Vikas, 1981.

15. Sigurdson, Jon lays stress on 'the industrial development of selected towns and cities which are intermediaries between the village on the one hand, with considerable emphasis on upgrading traditional village crafts serving agriculture'. (See his Rural Industrialisation in China, Harvard University Press, 1977, p.16). But Rao, VKRV, considered necessary to group villages into a cluster for planning rural industrialisation (see his 'Industrialisation and Integrated Rural Development', Man and Development, Vlo.I., No.2). Whatever methodological design for planning rural industrialisation may be, there are two issues which need proper attention while making efforts to plan the development of rural industries : (a) how to make them techno-organisationally viable units of production; and (b) how to technologically interlink them with the formal sector of the economy.